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ABSTRACT

The goal of this paper is to examine some erroneous ideas about teaching thinking skills and the use of computer tools, especially databases. The paper reviews: (1) the importance of databases to the teaching of social studies; (2) the teacher's role in aiding students to develop and use databases; (3) the reintroduction of effective teaching strategies; and (4) what is needed to teach thinking. The value of using databases in teaching social studies is that it places students in an active as opposed to a passive role in social studies education. The student prepared database allows students to determine information to collect and to organize seemingly unrelated bits of information into meaningful categories. The teacher must guide the development of categories and search procedures if the students are going to be able to use the database effectively. Critical elements in creating an environment to teach effective thinking are effective questions, an encouraging atmosphere, and patience. The Concept Development Strategy and the Interpretation of Data Strategy are useful in the development and use of databases. The nine steps for focusing on the teaching of thinking skills are included. (SM)

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DEVELOPING THINKING USING DATABASES: WHAT'S REALLY INVOLVED?

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by

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ABSTRACT

The purpose of this presentation is to expose some erroneous ideas educators seem to have about teaching thinking and teaching the use of computer tools, especially databases. First, the paper reviews the importance of databases to the teaching of social studies; secondly, the teachers role in aiding students to develop and use databases; thirdly it reintroduces some effective teaching strategies; and finally, discusses what is needed to really teach thinking.

Developing Thinking Using Databases: What's Really Involved

A wealth of opportunity for developing analysis, synthesis, and evaluation skills lies in preparing and searching a database[1]. The value of such a tool is that it places students in an active as opposed to a passive role in social studies education. The student prepared database allows students to accomplish several important objectives[2]. First, they can determine what information they want to collect. Second, they can organize seemingly unrelated bits of information into meaningful categories from which information can be retrieved. And third, they are able to search the data to develop and test generalizations. Even in the publisher prepared databases students are often allowed to develop their own search strategies. Simply, the youngsters are able to become actively involved in the act of thinking.

Rooze states that the teacher's role is very important for the successful use of the database.[3] This is especially true if students are developing their own. In such situations the teacher must guide the development of categories (fields) if the children are going to be able to use the resulting database effectively. Its is equally important for the teacher to guide the children in the development of search procedures in the use of prepared databases. To this point , we have been talking about the use of a tool and the development of a set of skills to use with the tool, the database management system. But if our goal changes, if we shift from teaching about the tool to teaching about thinking, then we are going to have to refocus our instructional procedures.

In an earlier article[4] I made the claim that the role of the computer in social education could be the development of thinking, as indeed in can. But in making that statement, I was also making the erroneous assumption that the teaching of an instructional mediating device could teach thinking. When in fact, if we are teaching thinking, we must focus the student's attention on the thinking processes we are using, making children aware of thinking skills that are integrated in our teaching strategies. As Beyer[5] points out, being involved in the act of thinking is not the same as learning how to think. For

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[1]Hannah, Larry. 1987. "Teaching Data Base Search Strategies." *The Computing Teacher*. (June): 16-17.

[2]Rooze, Gene E. 1986. *Using Computers to Teach Social Studies* Littleton, Colorado: Libraries Unlimited.

[3]Rooze, Gene E. 1986. "A Strategy for Helping Children Draw Conclusions." *The Social Studies* (March/April): 74-76.

[4]Rooze, Gene E. 1985. "Computer Use in the Social Studies: It May Be Thinking." *Computers and Social Education Newsletter*. (Fall): 1.

[5] Beyer, Barry. 1987. *Practical Strategies for the Teaching of Thinking*. Boston: Allyn and Bacon.

while it is one of our goals in social studies education to teach children to process information, a more significant one is to teach them the skills of thinking.

Thinking skills are often imbedded in our teaching strategies which are made up of a set of teacher actions, student actions, and a mediating device. Teaching strategies produce an interactive environment through teacher actions which can place the student in charge of his own thinking. The critical elements in creating such an environment are *first* effective questions, and *second* an open encouraging atmosphere, and *third* patience. Two strategies are useful in the development and use of databases, the Concept Development and the Interpretation of Data strategy developed by the late Hilda Taba[1]. Pon[2] introduced database management into her fourth grade classroom using both of these strategies. The Concept Development Strategy, Figure 1, provided the needed information processing techniques that helped students list, group, explain, label, and regroup information. This strategy helps students identify the *fields* which are like the items one would place on an index card. Once students have identified these fields they can extend their inquiry. In Pon's children's research, they were attempting to find out about the life styles of tribes of Indians in California. The next step was simply finding data which was needed to complete their forms.

Figure 1
CONCEPT DEVELOPMENT STRATEGY

Strategy Step	Teacher Action	Student Action
1. List data	What do you know, read, see or hear? Encourages wide participation.	Identifies facts
2. Group facts	What items seem to go together?	Identifies groupings
3. Explain groupings	Why are you placing these things together?	Explains groupings of items
4. Label groups	What would you call this group?	Places label on grouping
5. Regroup	Is there another way we can group this information?	Searches for alternative groups

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[1]Taba, Hilda. 1967. "Implementing Thinking as an Objective in Social Studies." In *Effective Thinking in Social Studies* edited by Jean Fair and Fannie R. Shaftel. Washington, D.C.: The National Council.

[2]Pon Kathy. 1984. "Databasing in Elementary (and Secondary) Classrooms." *The Computing Teacher* (November): 28-30.

After the children had their data forms completed and they had placed the data in their database, then Pon used the Interpretation of Data Strategy to help her children find relationships using the steps indicated in Figure 2. These steps are gathering data, relating the facts, making and explaining inferences, and generalizing. Using this strategy the children related important ideas, determined cause and effect, and found similarities and differences.

Figure 2
INTERPREATION OF DATA STRATEGY

Strategy Step	Teacher Action	Student Action
1. Gather information	What did you read, see, or hear?	Identifies facts
2. Relate facts	What relationships do you see? (Comparison, causality, idea, etc.)	Identifies relationships
3. Explain inferences	How do you explain the relationship? Why do you think that is so?	Explains relationship or justifies position
4. Draw conclusions	What can you conclude from what has been said?	Generalizes

Both of these strategies are excellent ways to teach the development and use of databases. But neither of these teaching strategies teach thinking which Beyer defines as the mental process through which individuals make sense of experience. The actual teaching of thinking requires that the children learn the steps of the strategy, as Taba originally suggested. Without learning the steps in the strategy and transferring the strategies of classification (Concept Development Strategy) and finding relationships (Interpretation of Data) into their life situations, the children have not learned a thinking strategy.

Beyer indicates that focusing on the teaching of thinking strategies requires that the teacher:

1. keep focus upon the strategy to be learned,
2. model the strategy,
3. identify the steps in the strategy,
4. engage students in talking about how they think,
5. guide the application of the strategy,
6. build in cues which help students transfer to other situations,
7. introduce the strategy when it is needed,
8. keep the data and media the same throughout introduction, and
9. keep the data or problem relatively short.

A wealth of opportunity for developing analysis, synthesis, and evaluation skills lies in preparing and searching a database, but teaching the use of a databases does not ensure the learning of these thinking skills. If we are teaching thinking, we must focus the student's attention away from the media to the thinking processes we are using, making children aware of thinking skills that are imbedded in our teaching strategies. The teaching strategies we are using need to be translated into thinking strategies. For the computer to become a tool for thinking, the children must be still be taught and they must still learn the thinking skills involved.